Space Weather Forecast

Issued on Monday, 15 July 2024 at 01:12 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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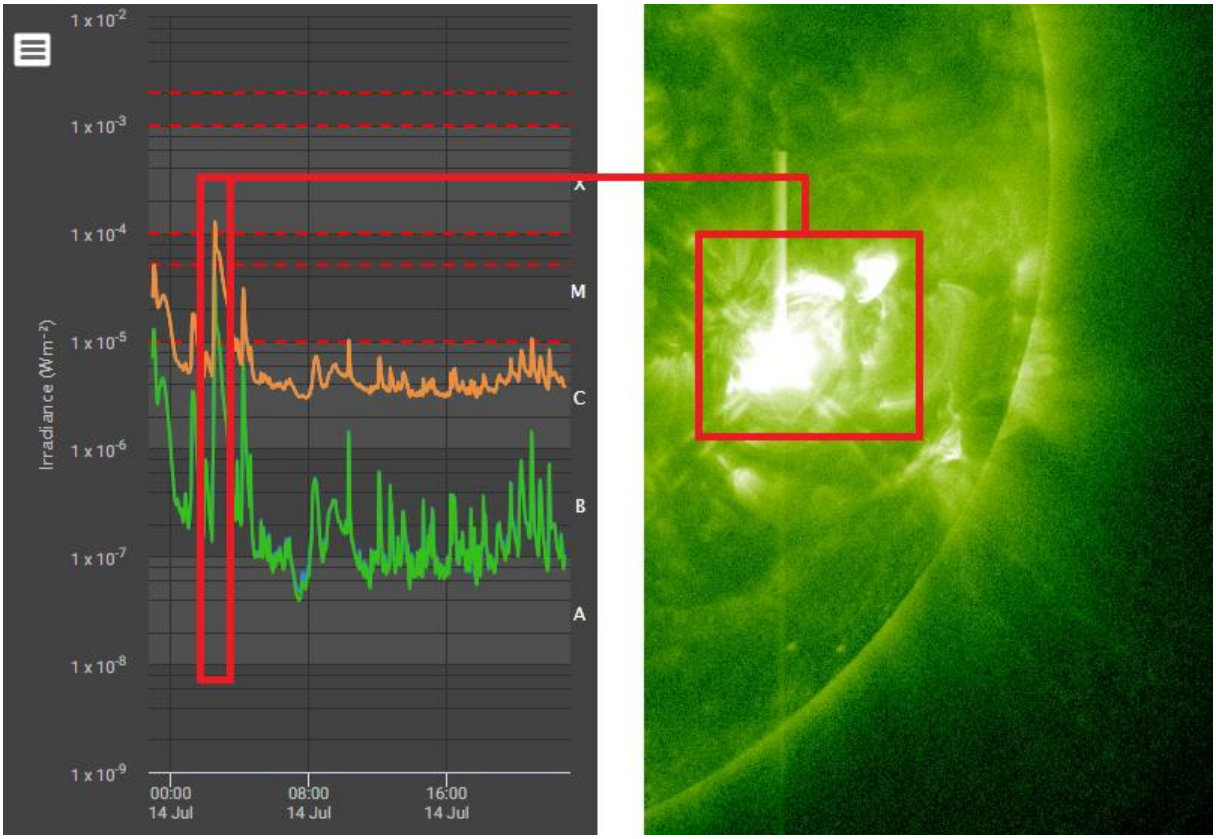
Space Weather Forecast Headline: Moderate-class X-ray flares likely (R1-R2 radio blackouts).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Activity has been high, with a spate of Moderate-class flares and a peak of a Strong-class flare at 14/0234UTC, with the majority of these emanating from a large sunspot region in the southwest of the Sun. There are now up to eleven sunspots on the facing side of the Sun, with a twelfth no longer visible in the southwest. Main changes in the period included areal growth of the main large spot in the most complex group, although the overall area was roughly constant.

Figure 1: X-ray trace of the peak Strong-class X-ray flare at 14/0234UTC at a near-Earth satellite and false-colour extreme UV imagery of its source region – a large and complex sunspot group on the southwest of the Sun. In this wavelength of light, sunspot regions appear brighter than their surroundings, and brighten still further when and if they produce flares.



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Despite the number and scale of solar flares, no Earth-directed Coronal Mass Ejections (CMEs) have been observed. Satellite imagery showed far-sided northeast and far-sided southeast-directed CMEs, as well as a possible third event from near the southern solar pole. None of these affect the forecast.

Solar Wind / Geomagnetic Activity: The solar wind signal comprised variations on a slow regime. The solar wind speed was at background levels, as was the number of particles comprising the wind and their associated magnetic field. The net result of the above solar wind measures was for provisionally quiet geomagnetic indices throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed, despite numerous large X-ray flares from a potentially prone location (the largest sunspot region nearing the western solar horizon).

Four-Day Space Weather Forecast Summary

Solar Activity: Further Moderate-class flares are likely, with a slight chance of further Strong-class flares, most likely from the most complex region. This risk abates slightly after midweek with the main sunspot group leaving the facing side of the Sun.

Solar Wind /Geomagnetic Activity: No Earth-directed CMEs feature in the forecast. A minor fast solar wind may now give some slight solar wind enhancement on days one and two (Monday 15 and Tuesday 16 July), but below Minor Geomagnetic Storm G1. After a return to quiet conditions midweek there is then a slight chance of G1 from a possible second stream of fast wind to end the four days.

Energetic Particles / Solar Radiation: No solar radiation storms are expected, with a slight chance of rising in response to any notable flares, mainly from the large off-going sunspot.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	1	1	1	5
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	75	75	75	60
Very Active	R3 to R5 X	Yes	15	15	15	10

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	15	15	10
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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